No. 665,052. Patented Jan. 1, 1901.

W. A. BERNARD.

HAND PUNCH.

(Application filed Dec. 11, 1897.)

(No Model.)

Fig. 1.

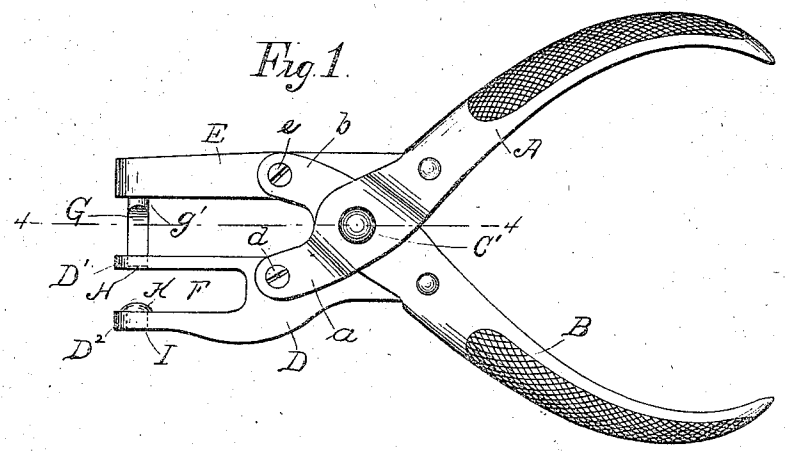


Fig. 2.

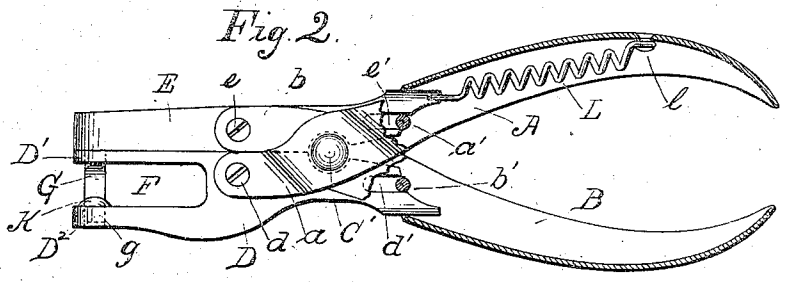


Fig. 3.

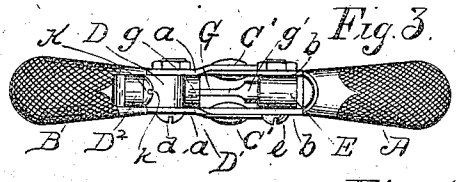


Fig. 5.

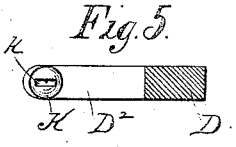
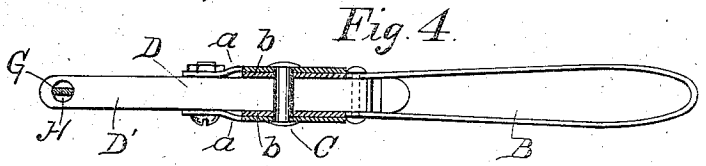


Fig. 4.



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WILLIAM A. BERNARD, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE WILLIAM SCHOLLHORN COMPANY, OF SAME PLACE.

HAND-PUNCH.

SPECIFICATION forming part of Letters Patent No. 665,052, dated January 1, 1901.

Application filed December 11, 1897. Serial No. 661,496. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. BERNARD, a resident of the city and county of New Haven, in the State of Connecticut, have invented a new and useful Improvement in Hand-Punches, of which the following is a full, clear, and exact description when taken in connection with the accompanying drawings, which form a part thereof, and in which—

Figure 1 represents a side elevation of a hand-punch embodying my invention; Fig. 2, a similar view, partly broken away, of the punch when closed; Fig. 3, an end view of the punch; Fig. 4, a horizontal longitudinal section on lines 4 4 of Fig. 1, and Fig. 5 a detail view of the counter-die.

In all figures similar letters of reference represent like parts.

This invention relates to hand-punches; and it consists in certain novel features of construction more particularly applied to that class of punches having parallel moving jaws, as more fully claimed hereinafter.

The parallel motion is given to the jaws by their connection with the handles, the connections and handles being shown formed substantially similar to those described in a former patent granted to me on May 6, 1890, and numbered 427,497, for pliers.

In the drawings, A and B represent the operating levers or handles, which are hollow and stamped up of sheet metal, as indicated in my former patent above referred to. The forward ends of the handles A and B are forked, as shown in Figs. 3 and 4, and the tines *a* and *b* of the handles A and B, respectively, cross each other and are pivoted together by a single rivet C or double rivet C′, as shown in Figs. 3 and 4. Between the tines or prongs *a* and *b* of the handles are the jaws D and E, pivoted to the outer ends of the prongs at *d* and *e* by screws or other means. The heels or rear ends of the jaws extend into the hollow of the handles and are provided with longitudinal slots *d′* and *e′*, and rivets or guides *a′* and *b′* are secured to the sides of the hollow handles and extend through the slots to impart a parallel motion to the jaws upon the movement of the handles. I do not, however, limit myself to the exact construction described above, as various equivalent means may be employed to give the heels of the jaws within the hollow handles a parallel motion. The forward end of the jaw D is bifurcated longitudinally in front of the pivot *d* to form two tines D′ and D^2, having a clearance F between them. At the forward end of the other jaw E is mounted at right angles thereto a punching-die G, the greater part or shank of which is flat, as shown in Fig. 3, so that the end *g* forms a cutting edge, while the base *g′* or portion adjoining the jaw E is cylindrical, for the purpose set forth hereinafter.

Within the end of the tine D′ is a circular perforation H of diameter corresponding to the diameter of the portion *g′* or base of the punch G, while in the forward end of the tine D^2 is a corresponding hole I. Fitted over the hole I on the inner side of the tine D^2 is a substantially semispherical or dome-shaped counter-die K, with a slot *k* of sufficient size to admit the cutting edge of the punch G. This counter-die may be embossed or stamped up from the tine itself or formed separate and secured thereto.

A coiled spring L is provided within the hollow of one of the handles A, one end of which is secured to a stud *l* on the inside of the handle at a point to the rear of the heel of the jaw and the other to the end of the jaw E on the same side of the fulcrum or pivot C.

In operation the paper or other material to be perforated is placed within the clearance F between the tines D′ and D^2 of the jaw D. The movement of the handles brings the jaws D and E together, while they still retain a parallel position relative to each other. The punch G being at right angles to the jaws moves directly through the perforation H, through the paper, and into the slot *k* of the counter-die K. When the end or cutting edge of the punch is about to enter the slot *k* in the counter-die K, the rounded or cylindrical portion or base *g′* of the punch enters and fits snugly within the perforation H, thus preventing any lateral displacement of the punch at the moment of cutting. As the base of the punch, which is adapted to fit into the perforation H at the moment of cutting or punch-

ing, is larger than the shank, the punch has a strong and substantial brace, while the shank may be reduced in diameter, so that only an incision of slight width is made in the paper. The rounded surface of the counter-die K prevents the cutting or raising of any bur on the paper as it is cut. The spring L performs two functions—opening the jaws and aiding in stripping the paper or other material from the punch—and it performs these functions in a peculiarly effective manner owing to its novel connection with the sliding jaw and handle, whereby one end moves on an arc while the spring is exerting its force. As the spring constantly exerts a tension on the heel of the jaw E to draw it longitudinally rearward in the hollow of the handle and as the jaws when in their most rearward position in the handles are also in their open position, the spring constantly tends to draw them apart. As the rear end of the spring is connected to the handle at a point to the rear of the jaw, when it is swung about the fulcrum of the tool as the handles are opened or closed it describes a greater arc than the forward end secured to the jaw, so that when the jaws are closed the axis of the spring lies nearly in the line of movement of the jaw to which it is secured and the full tension of the spring is exerted on this line. On the other hand, when the jaws are opened and the handles swung outwardly the axis of the spring lies at an angle to the line of movement of the jaw and less of its strength is utilized in drawing the jaw rearward. Moreover, at the time when the jaws are closed and when the full power of the spring is exerted in the line of movement of the jaw the spring is elongated and its tension greatest. Therefore the rotation of the axial line of the spring about a fulcrum tends to accentuate the power of the spring at the time when the jaws are nearly closed. At this time, however, the punching-die has passed through the paper or other article to be punched and the tine D′ must strip the paper from the punching-die. The greatest power of the spring is therefore required at this time, while the least possible power is required to hold the jaws open when once drawn apart.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a hand-punch or similar tool, the combination with operating-levers fulcrumed together, a jaw pivoted to one of said levers and having a sliding connection with the other lever, a coiled spring connected to said jaw and one of said levers, the direction of its axial line varying from the line of movement of said jaw, upon the operating of said levers, substantially as described.

2. In a hand-punch or similar tool, the combination with hollow operating-levers fulcrumed together, a jaw pivoted to the forward end of one of the levers, its heel extending into and having a sliding connection within the hollow interior of the other lever; and a coiled spring located within said hollow interior and connected to said jaw and to the lever to draw the heel of said jaw within said lever, and having the direction of its axis substantially correspond to the line of said lever as the same is swung about its fulcrum, substantially as described.

3. In a hand-punch or similar tool, the combination with operating-levers fulcrumed together, jaws pivotally connected to said levers, means for opening and closing said jaws parallel with each upon the movement of said levers; a punching-die on one of said jaws, and a receiving-die on the other jaw, a stripper for removing said punching-die from the article punched, and a coiled spring connected to one of said jaws for drawing said jaws apart, and mounted on said punch, so that the direction of its axis will be more nearly in line with the movement of said jaw when said stripper is in operation, substantially as described.

In witness whereof I have hereunto set my hand this 4th day of December, A. D. 1897.

WILLIAM A. BERNARD.

Witnesses:
F. J. SCHOLLHORN,
GEORGE W. ROBINSON.